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Editorial

RESEARCH TARGETING BUSINESS PROFITS: IMPACTS ON HEALTH AND ENVIRONMENT

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ABSTRACT: In contemporary research, funding is generally targeted toward assured and high business returns. In this business approach, studies for possible negative or side effects, especially the long-term use effects of the technologies and products are neglected or overlooked. Ample evidence related to the development of serious detrimental outcomes of many such improperly studied technologies before their widespread use is available in different aspects of the life of animals and plants, and on the overall environment of our planet. A few such examples of serious impacts on human health and the environment are cited in the article along with a brief discussion of the potentially risky application of such one-eyed research-derived technologies.

Key words: Research funding, Business, Health, Environment, Harmful impact.

In the present research concepts, business plays a very important role. Funding of research is directly related to high economic return or business in many cases. So, the creation of a market by influencing, modifying, or creating the requirement feeling or even intentionally creating problems of most individuals in a society, a country, or even bulk majority of people of the globe may be a broad yet unspelled objective of such research funding and administration. The announced statements available for such target-oriented research are always just some idealistic comments, like - such research is performed for the benefit of the common people, making their life easier and more comfortable, etc. Does this official show-case display the actual motto of a project hidden inside the files? Or, whether these are fed to us just to fulfill some hidden agendas targeting more and more business profits? A few such areas are discussed here.

SOME QUESTIONABLE AREAS

1. Instant gain/benefit versus long term damage

Many types of research are performed for showing beneficial research outcomes to the consumers without considering the adverse effects of their long-term use. It is perhaps performed to strengthen the “logic’ to sell a new technology or item. As a result, people come to know the adverse impacts of many technologies/products after their widespread use for a long period (BSE fast fact 2008, Pattanayak 2014, Hela *et al.* 2018).

i) Cosmetics are tested on the skin of small laboratory animals for a short period to know possible side effects. The normal life spans of these animals are only a few years and human beings use such chemical mixtures continuously for a far longer time. The difference in the body system, metabolism, systemic effects of absorbed materials, effects on the environment, etc. points are not considered important or overlooked in such studies (Hela *et al.* 2018, Pattanayak 2019b). Thus, short-term studies on lab animals may not identify the long-term effects of such products in humans.

ii) It took a few centuries to understand the detrimental effects of toxic addictive substances like tobacco, alcohol, or cannabis. Different preparations of many such materials were advertised and used for such a long period!

iii) Birth control is important to check the population explosion and as a part of the modern lifestyle.

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Contraceptive hormone pills are advocated worldwide for that purpose. Some side effects of the intake of these contraceptive pills, which often contain synthetic hormone mixtures at a high dose, are known (Sabatini *et al.* 2011). But study reports on health impacts in long-term continuous use of such synthetic hormones at the same dose irrespective of age or body weight, which act together with other xenobiotic residues inside the body, are not easy to find out!

iv) Oils containing trans-fats are considered detrimental to our health (Pattanayak 2019a). But the use of these hydrogenated vegetable oils (Dalda, Vanaspati, Margarine, etc.) containing trans-fats was considered healthy and even advertised as a better alternative to milk-derived butter or ghee and used for almost fifty years (the 1940s – 1980s). The trans-fats along with many other synthetic chemicals are taken regularly with processed and fried foods following the advertisement-based marketing, without giving any importance to the point that these may cause detrimental impacts on our health in such regular intake (Pattanayak 2017b, Pattanayak 2019a)!

v) Vegetarian cattle were fed scrap meat of sheep for getting better quality beef. Eating such beef caused Mad Cow Disease in humans after a few years (BSE fast fact 2008). But the event was identified at the cost of many lives.

vi) Several daily care FMCG products (fast-moving consumers' goods) such as toothpaste, mouthwashes, hand washes, shampoos, etc. contain extra fluoride, detergents, and strong antimicrobial agents that affect health, gut microflora as well as environment.

2. Effects versus side effects

Research funds are often granted to find the positive effects of the research proposals only and a negligible amount of money is earmarked to know the possible side effects, which may be to bypass the restrictions imposed by the relevant laws. These can cause many disastrous effects afterward.

i) The thalidomide episode

Widespread use of thalidomide was practiced in 1956 in Europe and Canada as an effective medicine with antiemetic and sedative activities in pregnant women. But it has resulted in the formation of a huge number of deformed infants. It was withdrawn in 1961 owing to such disastrous teratogenic effects at the cost of the lifelong suffering of many such deformed children (Shanbhag *et al.* 2006).

ii) Gastric ulcer from Aspirin

Aspirin has been used as an effective pain killer and many people were accustomed to taking this drug as and when felt required by them. But later it was found that it can cause erosion of the stomach from small sore up to the stomach perforation (US FDA 2008).

iii) Cumulative effects of radiations performed on the patients frequently without noticing previous exposures (from X-ray to CT scan) as a part of the diagnosis of the diseases may be dangerous. It may be far more detrimental to our health when added to radiation from mobile phones and their towers (Awosan 2016, Mitra and Pattanayak 2018).

iv) Serious collateral damages to important organs/ systems may happen during the treatment of different diseases such as chemo-radiation therapy in cancer, hormone therapies, etc. But such side effects, unless very serious/life-threatening and acute, are often overlooked, as such study may reduce related business (Chen *et al.* 2007).

3. Stop or reduction of funding for less profit

Funding for a research project is generally reduced or stopped when considered economically non-viable or less feasible, despite the existence of larger needs of the society.

i) Funding in search of new antibiotics has been reduced due to a huge reduction in the business profits from the early development of antibiotic resistance among the microbes (Pattanayak 2017a, Pattanayak 2018a, Plackett 2020).

ii) Funding of research for searching for alternative or renewable energy sources (such as bio-gas, photo-electric, water-borne hydrogen fuel, etc.) has not received due emphasis despite their need and green nature. Even after the initial invention years or decades back, the speed and quantum of research have been low in these fields.

iii) Plastics cause huge environmental and human/ animal health hazards throughout the planet (Pattanayak 2018b). The production of plastics causes the depletion of a huge amount of petroleum fuel and water. Many bio-degradable alternatives to plastics are available (such as jute-plastic, other bio-plastics, etc.) (Gill 2014, Pavel and Supinit 2017), but proper adaptive research for their production and widespread use is still lacking.

Even efforts are lacking to implement the technology already available to convert plastic waste to fuel (diesel, petrol, etc.) (Syamsiroa *et al*. 2014, Chanashetty *et al.* 2015, Karad and Havalammanavar 2017).

4. Intentional introduction of misleading technologies to create business opportunity

Numerous technologies are developed and advocated

in the name of betterment on living standards of the people. But many of these are not at all required and their widespread use may be detrimental. But once accustomed to them, people cannot think to leave them afterward.

i) Freshwater is scarce and invaluable. Irrational lifting or supply of groundwater in rural India for all household purposes in the name of supply of drinking water and their wastage may cause rapid depletion of groundwater even in the high rain-fed areas (Pattanayak 2015a).

Introduction of flush toilets replacing indigenous less water consuming practices, bathing and washing in the lifted groundwater replacing the pond, well, lake, river or canal water, etc. in thickly populated countries like India are some other examples (Pattanayak 2015a, Pattanayak 2016).

ii) Rapid depletion of natural forests and wastelands, use of groundwater in water-intensive agriculture in rural areas, and almost all household purposes of urban areas are threatening our sustainability and even future existence by inducing severe water crisis and many other serious problems like arsenic, fluoride, xenobiotic contaminations of drinking water, leaching and mixing of many synthetic organic and inorganic pollutants, saltwater intrusion in coastal areas and the crisis of potable water in different parts of the world. Depletion of potable or safe drinking water can only open and gear up the plastic bottled drinking water business across the globe causing more long-term harm (Pattanayak 2015a, Pattanayak 2015b, Pattanayak 2016).

Many cities like Chennai, Hyderabad, etc. are already reeling from potable water scarcity. Coastal cities such as Kolkata, Dhaka, Jakarta, Shanghai, etc. are experiencing saltwater intrusion in groundwater supplies (Pattanayak 2015b).

High incidences of cancers are found in the Bathinda district of Punjab, India. Heavy use of pesticides contaminating soil and groundwater is a likely cause of this (Thakur *et al.* 2008).

iii) Raising of high-rise flats in the urban and semi-urban areas for business purposes is performed at the cost of depletion of groundwater, loss of the top fertile soil of the agricultural fields to make bricks, and also losing many other important resources in the name of development, though many such flats remain unused.

iv) The widespread use of plastics for almost all household purposes may be considered unnecessary by logical analysis. But it is causing huge detrimental effects on the food chain, human or animal health, environment, and biosphere (Pattanayak 2018b). Though ample bio-degradable alternatives are available, for bottling of almost all drinks, carrying of almost all materials, in preparation of almost all household materials and water pipes, packing or keeping food materials, etc., plastics are used. We consume plastic additives and micro-plastics regularly from such sources.

Although regular intake of microplastics and plasticizers may be considered safe by the common people out of ignorance, scientists are concerned about their ill effects on humans, animals, and fish. It is already known that different plastic additives can act as some carcinogenic agents inside the human body (Brandt-Rauf *et al.* 2012, Pattanayak 2018b, Campanale *et al.* 2020).

Recently, different microplastics are found in human blood (Campanale *et al.* 2020, Leslie *et al.* 2022). Nobody tested the possibility of detrimental health impacts of these plastics before permitting their use, and nobody knows the long-term human health impacts of the absorbed microplastics. But the microplastics are already identified as some carcinogenic agents in some lower animals (Teles 2018).

v) The gathering of nuclear weapons and research on biological weapons has already caused huge detrimental effects and may even cause the abolition of the human race (Pattanayak 2021a). Even accidental leakage of bio-war agents can cause pandemic diseases or mass extinction of lives from our planet. Origin of the COVID-19 virus has been suspected from this angle.

5. Research performed for some vague purposes

Much of the so-called high funding research is performed to obtain some positive reports to introduce some questionable products in the market. These are sold then among the consumers by strong and continuous advertising pressure.

i) The anti-baldness medicines can stimulate the hair growth of a bald person. A large number of such medicines are available in the market.

ii) Hair oils can change the hair color or can increase hair growth, etc.

iii) The fairness creams can change the skin color and texture of a person.

Many irrelevant points are studied for the marketing of different cosmetics, but little importance is given to the toxicity study of the chemicals used in them (Hela *et al.* 2018).

6. Products used with unknown/unproven scientific basis

There are many food and healthcare products available in the market and used widely without any known study report on their actual efficacy.

i) The healthcare tonics, liver tonics, cough mixtures; digestive mixtures, etc. are used widely but with widely debated efficacy.

ii) Soft drinks containing sodium bicarbonate and dissolved carbon dioxide gas (converts to carbonic acid) are considered antacid and digestive!

iii) Some synthetic chemicals with or without traces of fruit pulp or juice are packed in plastic bottles, kept even directly under the sun for long periods, and chilled before use as some healthy fruit juices.

But no importance is given to the possible toxic effects of these chemicals along with leached plastics and their additives on our health even in their continuous use for years (Pattanayak 2019b).

7. Left areas for performing research

There are vital areas that require detailed study for benefit of the human race. But research in such areas is not taken up seriously, likely due to meager business benefits.

i) We are consuming varied synthetic chemicals every day and a portion of these toxins are perhaps gathered inside our body, but their cumulative effects on our health are still not studied (Pattanayak 2014, Pattanayak 2017b, Pattanayak 2021a).

ii) Different processed foods contain several chemicals and ingredients having the potential to cause serious harm to our health (Pattanayak 2017b). But information regarding their adverse effects is not available.

iii) Huge increase in the magnitude of the diseases like polycystic ovarian syndrome (PCOS), type 2 diabetes, cardiac diseases, chronic obstructive pulmonary disease (COPD) and other lung diseases, uterine fibroid, cholecystitis, urolithiasis, gastric ulcers, different types of hypersensitivity diseases, and above all - different types of cancer are generally attributed to some unknown reasons. Some of such diseases are marked as 'lifestyle diseases' and kept aside without seeking the link between specific 'lifestyle' with specific disease/s (Tabish 2017, Pattanayak 2019b).

The non-communicable diseases (NCD) cause a huge number of deaths in different countries, and in India, it is 61% of all deaths (Das *et al.* 2021).

iv) The industrial effluents and urban drain contents are not recycled and thrown in the canal or river without any treatment in many cases. These materials reach the sea after affecting the surrounding areas of the rivers or canals and ultimately enter the food chain of human and marine lives (Bhattacharya *et al.* 2014, Bhattacharya *et al.* 2016, Pattanayak 2021a). All are considered as some parts of development!

Are we performing ample research to know the actual impacts of all such materials on the biosphere as well as on our health?

8. The danger is known, but still advocated for use

Many gases and chemicals are advocated and advertised for widespread use perhaps to get more and more business profits, but their harmful effects are known to the scientific community. Many seminars are organized, and protocols are signed, but these fail to control the spread of the use of these materials.

i) CFC and HCFC gases

Chlorofluorocarbons (CFCs) are generally used in the manufacture of aerosol sprays, as some blowing agents for foams and packing materials, as solvents, and as refrigerants (UNEP OzoneAction prog 2001, Benhadid-Dib and Benzaoui 2012).

Hydro-chlorofluorocarbons (HCFCs) are used in refrigeration materials to bring cooling, in air conditioners, in foam blowing, as solvents in different chemical preparations, during the production of different aerosols, as a fire suppressing agent, etc. (UNEP OzoneAction Fact Sheet, Benhadid-Dib and Benzaoui 2012).

ii) Use of Halons

Halons are the members of organo-halogen compounds containing bromine and fluorine and one or two carbons. Halons are generally used as fire extinguishing agents and for different related purposes (UNEP DTIE OzonAction Programme 2001, MPSDOL 2007).

CFC, HCFC, and Halons are triggering the formation of holes in the ozone shield of our planet permitting entry of harmful ultraviolet rays which have been associated with skin cancer, eye diseases, etc. These greenhouse gases are also causing an increase in global temperature (UNEP DTIE OzonAction Programme 2001, MPSDOL 2007, Benhadid-Dib and Benzaoui 2012).

iii) Disposal of used batteries and e-wastes

Batteries are used to supply electricity to our modern gadgets. But these contain toxic metals like lead, mercury, cadmium, lithium, nickel, cobalt, chromium, etc. which have detrimental effects on our health as well as on the environment. But there is no plan for their scientific disposal after use and in many cases; these are directly thrown in the garbage box to reach the environment (Morrow 2001, Kang *et al*. 2013). Similarly, a vast amount of electronic wastes are generated every day and their effective disposal systems have not yet developed, causing serious impacts on health and the environment (Munialo and Collins 2020)!

9. Some other unknown or less known areas

i) Whether intake of Iodine with salt for decades irrespective of age or health status by the people residing at non - iodine-deficient soil has any negative impacts on health is unknown.

ii) Different growth promoters; production, and performance enhancers are used in meat-fish-egg producing sectors regularly. A part of these reaches us through their produce. The impact of residues of these materials on our health, although having research reports and instructions in some cases, is not strictly implemented. Common people are neither aware nor proper labeling of quality assurance on food items available in the markets.

iii) The cumulative effects of preservatives, stabilizers, coloring, flavoring agents, etc. in food items, chemicals used in drinks, medicines of synthetic origin, plastic additives, microplastics, other xenobiotic residues, etc. on our health is not studied properly - though these are regularly taken by the people (Pattanayak 2014, Pattanayak 2017b). Different adulterants and the synthetic materials used in the items like manufactured tea-dust or synthetic milk and milk products (like casein, butter, ghee, paneer, etc.) are some other added factors (Pattanayak 2014, Pattanayak 2017b, Pattanayak 2019a).

iv) In microwave heating, the molecular heating technique is used. Different food items are heated by keeping them in different pots before their use as some food. That may have some serious health impacts on our health, particularly from long-term intake of such microwave-cooked foods (El Ghazaly *et al.* 2014).

v) High concentration of Chlorine added in the municipal drinking water consumed by us regularly for years may have adverse effects on our health (Mohsen *et al.* 2019).

Many of these synthetic chemicals are experienced by our body for the first time throughout the entire evolutionary period. So, these are perhaps considered foreign to the body system and their adipose tissue accumulation and/or long-term effects may be a strong reason behind initiation as well as triggering many dangerous diseases, reasons of which are declared as not identified.

CONCLUSION

The simple lifestyle of rural people is fast-changing towards a complex and artificial urban life in the name of development, making life easy and comfortable, staying free from diseases, etc. The entire process has got momentum in the last few decades. But to supply these facilities, we are perhaps paying a huge cost. The time has come to calculate the actual cost and benefit of several aspects of development for the long-term sustainability of the human race, biodiversity, and ecosystems.

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